Figure 1 indicates a similar bias. As this is evident for the larger samples ($n \geqq 100$), it appears that a 12–15 percent bias is a good estimate of the bias that can ordinarly be expected for an exponential type of distribution. Other distributions examined in table 1 and data for small samples indicate little or no bias compared with the root mean square estimate.

Book Reviews

Statistics: A New Approach. By W. Allen Wallis and Harry V. Roberts. The Free Press, Glencoe, Ill. 646 pages. 1956. $6.

HERE WE HAVE NOT ONLY a new approach but a most welcome departure from the unappetizing pottage of re-used and worn-out ingredients so often served as a course in "elementary statistical methods." The reader's interest is aroused from the beginning, both by the diversity of statistical problems and applications set before him and by the attractive way in which they are presented. If any pedagogical device can imbue a prospective student with a desire to study this subject, this text should be it. With all this to commend it, it would be disappointing indeed if its technical quality were to fall short of expectations. Any possible misgivings on that score are groundless.

Although the treatment is largely non-mathematical, in the sense that much of the algebraic symbolism cluttering up some texts is happily absent, even a cursory reading makes it clear that the basic concepts of modern statistical thinking are covered in admirable fashion. A surprisingly large amount of material that authors of other elementary texts regard as "too advanced" for beginners is included here without fuss or apology. The treatment confirms what the more astute among beginning students probably have long suspected—the important principles are not hard to grasp when explained in the vernacular by someone who understands them himself.

It is difficult to summarize the content of a work of such scope in a short review. The subject is introduced in a thought-provoking presentation of the nature of statistics and its application to many different subject-matter fields, the planning of statistical investigations, and the interpretation of data. This is a lively discussion with numerous case histories to illustrate ideas.

Tabulation of data and the use of ordinary descriptive statistical measures are covered in the next section. These also are presented in a manner that is a far cry from the usual drab recital with which most of us are all too familiar. Part III takes up sampling theory, statistical inference, probability, sampling distributions, the theory of testing hypotheses, decision functions, and the theory of estimation. The last section, entitled "Special Topics," treats experimental design, sample design, statistical quality control, regression analysis, and time series analysis. An appendix includes tables of squares, square roots, and random digits. Tables of the Normal Probability Integral are pasted to the insides of the two covers.

This reviewer finds only one possible fault with the book if it is used as a text: All of the material is presented so lucidly and challengingly that an instructor will find it hard to restrain himself from trying to crowd it all into a single one-year course. The intent of the authors is clearly that the instructor exercise judgment in the selection of topics for any one course. The wealth of material provided permits a selection that should fit the needs of almost any group with which an instructor is likely to be confronted.

Many mature practicing statisticians trained in the old school could read this work with profit. This reviewer knows of no way in which one could bring himself up to date on modern statistical thinking with less effort or mental strain. A reader at any level of statistical maturity can find something of interest in it.

Walter A. Hendricks

Income of the American People. By Herman P. Miller. John Wiley and Sons, Inc., New York. 206 pages. 1955. $5.50.

SECOND in the new Census Monograph Series, this study by Herman Miller maintains the high standards set by Ronald Mighell in the first volume of the series. Mighell, assigned to the subject of American agriculture, had to create fresh interest in a mass of Census and other data with which most of his readers would be at least partly familiar. In this difficult task he was surprisingly successful.

Miller was not faced with the problem of invoking new interest in old material. His assigned field, the Census income data, had not been nearly so thoroughly exploited as the Census agriculture data. Consequently, he had numerous opportunities for advancing our knowledge with respect to the size distribution of income in the United States. He has taken advantage of as many of these as could reasonably be expected.

The title selected by Miller or his editors is short and simple. Unfortunately, it is also a little misleading. The book is concerned almost exclusively with size distributions of income and changes therein, as measured by data collected in the decennial Censuses of Population for 1939 and 1949, and in the annual income surveys made by the United States Bureau of the Census for the years 1944–51. This is an important subject, well handled; but it is by no means all there is to know about the "income of the American people."

The analysis is mainly concerned with the measurable factors that help to account for differences in incomes among individuals in any given year. The overall distribution of persons by size of income is broken down into homogeneous groups with respect to sex, age, color, education, marital or family status, work experience, geographic location, and occupation. The relation of work experience to the income distribution, for example, is demonstrated by contrasting the income distribution for employed workers or full-year workers with that for all other persons. The role of geographic location is interpreted in terms of (1) regional differences in income, (2) differences associated with urban, rural farm, or rural nonfarm residence, and (3) differences associated with city size.

All of these factors are related to income, and the relationships are for the most part fairly well known. But Miller is not content simply to point them out once more; he interprets his results in the light of various theories advanced to account for the distribution of incomes. Although he rightly disclaims having demonstrated either the validity or invalidity of any single theory, his efforts are nevertheless productive of several new insights into the problem. Probably his most important contribution is the detailed analysis of occupational differentials in the distribution of income.

Preceded by a foreword, a preface, and an introduction, the nine main chapters start with a summary chapter that actually summarizes. They are followed by three long appendixes that cover (1) definitions and explanations, (2) the quality of Census income data, and (3) detailed tabulations of workers in each occupation by wage-salary income in 1939 and 1949. The introduction, written by Dorothy Brady, points out the book's significant contributions and some of the things that still need to be done in the income-size-distribution field. It thus constitutes a sort of built-in review by an outstanding authority.

Some farm income data are included, but the reader who has a special interest in farm income should be warned that he is not likely to find what he wants. The Census income data represent money income only, whereas nonmoney income is important for farm workers. For this reason, and because only wage and salary income was obtained in the 1940 Census, the farming occupations are excluded from the detailed tables and analysis of occupational differentials. The few tables included for farm income are generally based on residence (rural farm families and individuals) or principal occupation (farmers, farm managers, and farm laborers). The joint Census-Agriculture report on "Farms and Farm People" is the source of the only table here included on income of farm operators as defined in the Census of Agriculture.

The material in the book is well organized and carefully assembled. Diligent search by this reviewer revealed only two points to criticize, and they are minor: (1) Hans Staehle's "Ability, Wages, and Income" in the *Review of Economic Statistics* for February 1943 is unaccountably omitted from an otherwise excellent bibliography; and (2) footnote references to "Farms and Farm People" give table numbers without specifying the chapter meant.

Ernest W. Grove

Input-Output Analysis: An Appraisal. Studies in Income and Wealth, Volume 18. By the Conference on Research in Income and Wealth. Princeton University Press, Princeton. 371 pages. 1955. $7.50.

INPUT-OUTPUT ANALYSIS, or the study of interindustry relations, although diverting a significant portion of our research talent in the 1940's and early 1950's, has remained somewhat of mystery to many in the economic profession. Thus, it was welcomed that the National Bureau of Economic Research Conference on Research in Income and Wealth devoted its 1952 meetings (1) to acquaint the economic profession with this relatively new analytical tool and (2) to assess the potentialities of this approach.

This book records the events of this meeting, or, we should say, the evidence presented by such champions of input-output analysis as Wassily Leontief, W. Duane Evans and Marvin Hoffenberg, and Frederick T. Moore in the defense of the approach, and that of Carl F. Christ and most of the discussants of the papers by the prosecution. The readers are the jury, for, in some ways, in contrast to the several books concerned with selected readings on a particular topic, the presentation resembles the record of a court case.

Here, as in the case of a jury trial, a member of the jury, or a reader, at times may question the relevance of some of the evidence presented. He may feel, as often is the case with a juryman, the need for final instructions to point up the central issues to be resolved. In this courtlike procedure, the proponents of input-output analysis, not unlike attorneys for the defense at times, have made some claims for their approach that have yet to be substantiated by empirical tests.

When we think of input-output economics, two aspects are considered: (1) Input-output tables which may be regarded as statistical descriptions of certain relations among industries; and (2) input-output analysis as an analytical tool for explaining consequences of policy decisions and for predicting behavior of our economic system. There appears to be considerable agreement that research in input-output work, especially that associated with input-output tables, has resulted in many contributions to better understanding of particular industries and the nature of relationships among industries, and that it has pinpointed deficiencies in our statistics and the need for consistency in our basic statistics. Some critics would even venture to say that this aspect of interindustry research may be the more lasting contribution.

It is in the potential use of this approach as an analytical tool to explain and predict economic behavior that little agreement is found. Input-output analysis is essentially a theory of production, in fact, a special type of production function.

Critics condemn input-output analysis from the standpoint of traditional theory because of the assumptions used in the approach, especially the controversial assumption that no substitution among inputs is possible in the production of any good or service, as Carl F. Christ indicates in his discussion.

Proponents, however, argue that there appears to be considerable stability in the input coefficients. They further point out that these coefficients may be revised to represent conditions existing as of date of problem. In addition, if input coefficients for a particular industry group are known to be poor, submodels may be constructed and linear programing techniques (which allow for substitution) may be used for that particular sector.

The final test as to whether the assumptions are too restrictive to permit reasonable results must wait until sufficient results from empirical tests are obtained. Only limited empirical evidence was available at the 1952 meeting.

The lack of material for evaluation of actual results of input-output analysis, the many problems of data and of techniques that had to be reconciled in preparing input-output tables, and the relative newness of the analytical tool, probably explain why considerable space in the papers was devoted to problems of data and technique. To newcomers in this field, particularly economists who are trained in marginal analysis, this wealth of information interspersed among the evidence submitted to quiet the controversy may at times be confusing. These will find it profitable to read first the papers by Carl F. Christ and Frederi[ck] T. Moore, especially pages 138–144 in the former, and pages 222–226 in the latter. These pages clearly define the conceptual framework of input-output analysis and show how it fits in with economic theory.

Anthony S. Rojko

Approaches to Economic Development. By Norman S. Buchanan and Howard S. Ellis. The Twentieth Century Fund, New York. 494 pages. $5.

THERE IS LITTLE in this book with which the economist will want to quarrel. It gives a long and sometimes overlapping account of the factors that influence economic development; examples of the history of development; and some desiderata for policies and attitudes in both underdeveloped and developed countries that would serve the cause of more rapid progress in the poorer areas. The book will be useful as a text to introduce students to a set of facts and considerations that have a bearing upon the fashionable topic of economic development in underdeveloped countries. Beyond that, it will be useful to economists primarily for reference purposes, as a rather comprehensive compendium of sidelights and ramifications of the subject.

Personally, I found most satisfying the chapter on "A General View of Economic Development," written by Professor Buchanan. Having just come from a roundtable discussion, during which some economists argued that technological progress could do nothing to change the capital-output ratio (though, to my way of thinking, that ratio is in part even a *function* of technology), I found Professor Buchanan's views on the subject refreshing: "The rate of growth of total output and real income per person is not determined by the rate of capital accretion alone * * * the secular rise in national incomes * * * must be partly attributable to other factors. Of those that are conceivably pertinent, none seems equal in importance to technical progress."

Readers will also be reminded of Schumpeter's insistence that economic development does not typically spring from the accumulation of new capital, but rather from "the realization of new combinations of the *existing* availabilities of factors of production." [Italics are the reviewer's.] Incidentally, there is no reference, in Buchanan and Ellis, to Schumpeter's *Theory of Economic Development.* Perhaps as a theory of the business cycle, the authors did not find it pertinent to their subject. But it is in the form of cycles that economic growth has materialized thus far.

The authors' theoretical opinions on important questions of fact and policy do not always coincide. Professor Ellis (pages 308 ff., and elsewhere) is rather critical of the thought that inflation is an effective mechanism in commandeeri[ng] resources and factors for "new combinations" an[d] thus, in some circumstances, may be of considerable positive importance for economic development. This attitude contrasts with Professor Buchanan's view that "credit creation, either through the state or through the banking system, played a major role in real capital formation; without it, there was no means by which labor and other productive resources could be brought together initially to make capital goods."

Again, Professor Ellis is stern on the question of protectionism in underdeveloped countries: "The real perils of infant industry protection in any objective view * * * are not its threat to the older countries, but the potential losses for the underdeveloped areas themselves. How long are these countries prepared to deny to their domestic consumers the gains of cheaper or better imports?" It is difficult to think that Professor Ellis is not prepared to admit "that economic fact which has * * * been one of the principal sources of the world's enrichment—namely, the existence of increasing returns," to quote Colin Clark's *The*

Conditions of Economic Progress. "With increasing returns," Clark adds, "a valid case *may* arise for economic nationalism or protectionism, * * * a country may transfer resources from industries *at present* more productive, to those which it proposes to protect, and *in the long run* enrich itself by so doing." [Italics are the reviewer's.]

Professor Buchanan's views on the subject appear to be rather different. He states that, "The rank and file of the labor force acquired their new knowledge and new skills by 'on-the-job' training and little else during the early phases of economic development in all countries, * * * they learned by doing." Accordingly, they developed efficient industries as they expanded them, and learned in the process. Professor Buchanan thus has a different evaluation of the facts of education, of increasing returns in industry, and—implicitly—of the role of protectionism in underdeveloped countries. I mention these divergencies among the authors not to express disapproval. On the contrary, I think it is healthy for young students of economics to find out for themselves that our discipline is by no means agreed on many theoretical conclusions, or policies based upon them.

In the chapter on "Interest and Responsibilities of the United States," Professor Ellis advocates an enlightened economic foreign policy for this country: To promote free trade; to stabilize its economy; to help stabilize the income of raw-material exporting nations, and to further economic development abroad in other ways. Similarly, we should applaud the unanimous conclusion of both authors that the main impediment to economic development is a cultural environment hostile to change. It points the way in which changes can be brought about; it also indicates the crucial difficulties that lie ahead. In Max Weber's view "the dominance of magic * * * has been one of the greatest impediments to the rationalization of economic life." (*Wirtschaftsgeschichte*, Munich, 1924, p. 308.) Weber also thought that, apart from Judaism and Christianity, there are only two or three Oriental sects (one of which is in Japan) that represent religions expressly hostile to magic. On this basis, it would appear more probable that economic development will proceed faster in Latin America than in East Asia—even if we leave out of consideration the differences in population density and other factors.

J. H. Richter

Measuring Business Changes. A Handbook of Significant Business Indicators. By Richard M. Snyder. John Wiley & Sons, Inc., New York. 382 pages. 1955. $7.95.

PREPARED PRIMARILY for businessmen, this book describes the nature, composition, and sources of most of the strategic statistical indicators of general economic activity prepared by private institutions and Government agencies. Its ultimate objective is to provide a working knowledge of these series which will enable businessmen to appraise the outlook for their own firms and industries in the light of changes in the general economic situation that these series reveal. The material will also prove valuable to economists and statisticians, including those in the field of agriculture, who have need for general economic time series in their analytic work.

Organized in handbook style, the volume is divided into separate sections dealing with statistical series on (1) national income and production; (2) population; (3) labor; (4) commodity prices; (5) production and business activity; (6) construction activity and cost; (7) trade; (8) financial activity; and (9) stock prices.

The series are described, and their meaning and usefulness explained, in remarkably understandable language. In this nontechnical presentation, however, much of the essence of the underlying economic and statistical concepts is retained. The reviewer was particularly impressed with the clarity and preciseness of the treatment of national income and production statistics, the various price indexes, and the series on industrial production.

Despite the success of the author in making economic statistical indicators more understandable and useful, a full understanding of the statistical series covered and their limitations require some knowledge of economics, statistics, and statistical methods beyond that provided in this particular volume. Readers without technical background will still find it necessary to consult other sources for a complete understanding of some of the materials presented. For example, one needs a fairly good grounding in index number theory and construction to comprehend fully such a section as the one that deals with the various commodity price indexes.

In addition to the descriptions of specific series in the nine major sections, the introduction contains a general bibliography on sources of economic data, both Government and private. The usefulness and accuracy of the materials in the several sections are aided by the fact that leading statisticians in Government and business provide some of the explanatory materials, and reviewed parts of the manuscript. In general, this handbook is a welcome addition to the working libraries of economists, statisticians, and businessmen who need to understand and use a wide variety of statistical indicators that measure the performance of the American economy.

Robert H. Masucci

The Great Plains in Transition. By Carl Frederick Kraenzel. University of Oklahoma Press. 428 pages. 1955. $5.

A HUMID-AREA type of civilization cannot thrive in the semiarid Great Plains without constant subsidy or repeated impoverishment of the residents. Kraenzel states this as his basic hypothesis. He does an excellent job of recounting how the settlers moved into the Plains from the humid East, bringing their humid-area institutions, farming practices, and ways of thinking, with the consequences that followed. The first 20 chapters cover the physical features, early history, settlement, drought and depression, and problems of the Plains.

Kraenzel is in a particularly good position to tell this story. He saw many of these problems firsthand during the 1930's when he was associated with Montana State College and its efforts to develop programs for the Plains.

The question arises whether humid-area influences can still be blamed for difficulties in the Plains. Migration into the Plains from humid areas is a thing of the past. Instead, there has been a large outmigration from the Plains to the West Coast and other areas. Meanwhile, the Great Plains region has developed an agricultural economy of its own. It is true, as Kraenzel points out, that this economy is unstable and of high risk, because of climatic conditions in the region and the marginal nature of its agriculture. Perhaps much of the "transition" in the Plains occurred during the period of the drought and the depression, and in the war years that followed many of the vestiges of the humid system of agriculture disappeared.

In the latter part of the book, Kraenzel turns to solutions. For civilization to survive and thrive in the Plains, he thinks that the addition of three basic traits to the imported humid institutions will be necessary. These traits—reserves, flexibility, and mobility—would orient the humid institutions to such an extent that they could contribute to the cultural progress of the Plains.

Several chapters are devoted to regionalism as related to problems of the Plains. A form of administrative regionalism is proposed. A regional advisory council is suggested. It would be made up of 2 State senators and 2 United States senators from each of 10 States. The council would study the problems of the Plains and suggest solutions. It would also give advisory guidance to resource-development agencies.

Kraenzel's book is timely, for drought in the Southern Plains and surplus wheat production have again brought problems of the Plains to national attention. The United States Department of Agriculture, with the cooperation of the Great Plains Agricultural Council, recently issued its "Program for the Great Plains" as Miscellaneous Publication 709. The goal of this program is to achieve a more stable agriculture, more dependable sources of income, and a progressively satisfactory livelihood for the people of the region. Although Kraenzel's proposed regional council may not find general acceptance, his analysis and suggestions are basic to understanding the problem of the Plains.

Harry A. Steele

Agriculture in Haiti. By Marc Aurele Holly. Vantage Press, Inc., New York. 313 pages. 1955. $3.50.

TO ADOPT AND TO ADAPT is Marc Holly's message to students of underdeveloped countries who wish to apply knowledge newly gained from study abroad to their country's problems. The central issue for Mr. Holly is how the tradition-bound society of Haiti, composed of an illiterate peasantry and a small but sacrosanct elite, can develop a national will, and the organization, for higher than starvation levels of existence. The essential purpose of the book is to describe the technique of agriculture within the economical, sociological, and institutional framework of the Isle of Haiti. Another objective is to suggest how the situation might be improved.

Beginning in the traditional manner with climate and soils, the author leads you through a descriptive account of each type of crop and species of livestock in Haiti; with a minute brush he paints a picture of the state of things agricultural in the island. The first half gives a detailed description of past developments and the present situation, botanical names of all varieties of crops, with numerous quotations of their yields in Africa and India, and some generalizations about their possible yields in Haiti.

Other sections deal with agricultural education and marketing problems with regard to domestic demand and exports. The last chapter is devoted to general criticism of past regimes and to approval of the "dynamic and progressive" Government of President Maguire.

The author's description of the deplorable credit conditions in the agricultural sector of the economy may be accurate as of 1945, when he was writing most of this book while a student at Oxford University. He describes conditions under which the only sources of credit to agricultural entrepreneurs were the traditional money lenders, whose terms of credit varied from a week to a year, with interest rates of 50 to 200 percent. His solution is to develop credit unions among the peasantry. French and German sources are quoted to support this conclusion. But if Mr. Holly had brought his book up-to-date he could have given the reader a description and analysis of the 150 or so credit unions established by the Oblate Fathers and Service Cooperative Inter-Americain de Production Agricole.

This omission is typical of the shortcomings of the book. It gives almost no results of recent research on Haitian conditions that are readily available in Haiti. Instead, the book is more than adequately loaded with long quotations of authoritative land economists and economic geographers on England, Africa, and India.

Although he deplores the lack of statistical material in Haiti, the author overlooks a rather extensive body of data—reports of a series of crop-yield experiments and of results of programs and other agricultural research carried out in Haiti from 1946 until 1953, the year in which the book was in its final draft.

Mr. Holly is a Director of the Organization for the Development of the Artobonite Valley—O. D. V. A., which is Haiti's TVA. A rather extensive planning program for development of the Artobonite Valley, Haiti's area of greatest potential for increased production, was published in draft form in September 1952. There is little mention of the extensive and intensive collection of research results contained in that report.

In summary, Mr. Holly's book contains ample detailed descriptions of Haitian agriculture, together with a diagnosis of economic and social ills and a prescription for their cure. But it would have held more general interest for agricultural economists if the author had drawn from his own recent experiences and from studies more recent than those he cites in this work. Perhaps this will be matter for a later book.

John R. Churchill

Using American Agricultural Surpluses Abroad. By Howard R. Tolley. With a Statement by the Agriculture Committee on National Policy of the National Planning Association. Planning Pamphlet No. 91. National Planning Association, Washington, D. C. 30 pages. 1955. 50 cents.

POSSIBILITIES of greater utilization of our abundant supplies of agricultural products abroad are outlined. The long-run solution of the surplus problem, Mr. Tolley believes, lies in expanding world economy and a progressive reduction of trade barriers by all countries in the world. A statement of the Agriculture Committee on National Policy of the Association expresses the belief that our surplus farm products should be donated or sold for foreign currencies "to meet human needs and promote economic development abroad rather than be allowed to go to waste." In working out foreign distribution programs, however, the committee thinks "this country should consult and cooperate with other countries of the free world—to be sure that normal trade is not impaired and to obtain the support of other agricultural exporters in these programs."

List of Statistical Series Collected by International Agencies. United Nations, New York. 78 pages. 1955. 80 cents.

LISTED in this publication are the series published by the United Nations, the regional economic commissions, the specialized agencies, and certain of the intergovernmental organizations.

Selected Recent Research Publications in Agricultural Economics Issued by the United States Department of Agriculture and Cooperatively by the State Colleges [1]

Arthur, I. W., Johnson, E. A. and Wunderlich, Gene. farm tenure and family adjustments to social security. U. S. Dept. Agr., Ext. Serv., PA–280, 12 pp. Feb. 1956. (Prod. Econ. Res. Br., ARC, cooperating.)

This pamphlet includes a summary of discussion of the old age and survivors insurance program, the benefits and costs of the program, and of the adjustments that farm families may wish to make to the program. It is intended for the use of extension workers in advising farm families.

Friedman, B. A. and Radspinner, W. A. vacuum-cooling fresh vegetables and fruits. U. S. Dept. Agr. AMS–107, 13 pp. April 1956.

Vacuum-cooling as a means of preserving agricultural produce has progressed to the point where vacuum chambers large enough to accommodate a loaded refrigerator car or truck trailer have been constructed. Vacuum-cooling was first used commercially in 1948. The process, over-simplified, is one in which air is pumped out of a vacuum chamber in which the produce has been placed. Evaporation of water from the produce cools it.

Gray, James R. southwestern cattle ranches, organizations, costs, returns. N. Mex. Agr. Expt. Sta. Bul. 403, 87 pp., illus. Feb. 1956. (Prod. Econ. Res. Br. ARS.)

This is the fifth of a series of nationwide studies of family-operated farms and ranches that deals exclusively with western livestock ranches. From 1940 to 1954, the size of the average cattle ranch increased from 7,676 to 10,592 acres. Cattle numbers per ranch on January 1 varied from 213 head in 1940 to 227 head in 1952. The calf crop varied from 71 to 80 in the same period. The estimated value of investment per ranch averaged about $36,000 in 1940 and about $155,000 in 1952. Cash income per ranch varied from about $4,000 in 1940 to more than $18,000 in 1952.

Greig, W. S., and Spurlock, A. H. margins and costs in marketing florida sweet corn. U. S. Dept. Agr. Misc. Pub. 719, 11 pp., illus. April 1956.

Florida sweet corn marketed in Baltimore at the height of the production season in 1955 brought the grower $1.70 a crate of 4½ to 5 dozen ears, and consumers in Baltimore paid $3.87 for the corn at retail. Out of the grower's $1.70, he paid $1.03 for picking, packing, chilling, sale commission, and other shipping-point costs, leaving him 67 cents. Production costs had to come out of the 67 cents.

[1] Processed reports are indicated as such. All others are printed. State publications may be obtained from the issuing agencies of the respective States.